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Salmonella and the U.S. Horse Population

The USDA's National Animal Health Monitoring System (NAHMS) found a lower level of fecal shedding of *Salmonella* in horses than has been reported in much of the scientific literature.

Salmonella species have been associated with illness among many animals, including horses. Horses shedding the bacteria in feces may or may not show signs of illness. The NAHMS Equine '98 study found 14 different serotypes of *Salmonella* species, several of which are not commonly associated with illness in horses. The serotypes identified in grain/concentrate samples are not typically associated with illness in horses, and the overall level of *Salmonella* found in grain/concentrates was low.

This USDA study collected data on equine health and management practices from a representative sample of equine operations in 28 states¹. These operations represented about three-fourths of the equine population and three-fourths of operations with equids in the U.S. Overall 2,904 operations with one or more equids participated in the Equine '98 study's first interviews from March 16 through April 10, 1998. More detailed information on the study and the sampling methodology is available in NAHMS Equine '98 tabular summary reports.

Fecal Culture Results

NAHMS collected fecal samples from 8,417 horses on 972 operations with three or more horses to test for shedding of *Salmonella*. Many of the previous reports in scientific

literature were based on smaller populations or relied on veterinary hospital populations which likely accounted for differences in findings. For the NAHMS study, all horses, including horse foals, were sampled on those operations with fewer than 10 resident horses, while the number of horses and foals sampled for larger operations varied by size of operation. Each horse was sampled only once. The USDA's Agricultural Research Service (ARS) in Athens, Georgia, cultured the feces.

Fecal sampling results showed a low prevalence of *Salmonella* shedding in U.S. horses. It was estimated that 0.8 percent of the horses shed *Salmonella* and that at least one horse on 1.8 percent of operations shed the organism in its feces.

Equine '98 found that 1.4 percent of horses in the Southern region and 0.2 percent of horses in the

Figure 1

Percent Resident Horses Culture Positive for *Salmonella* by Region

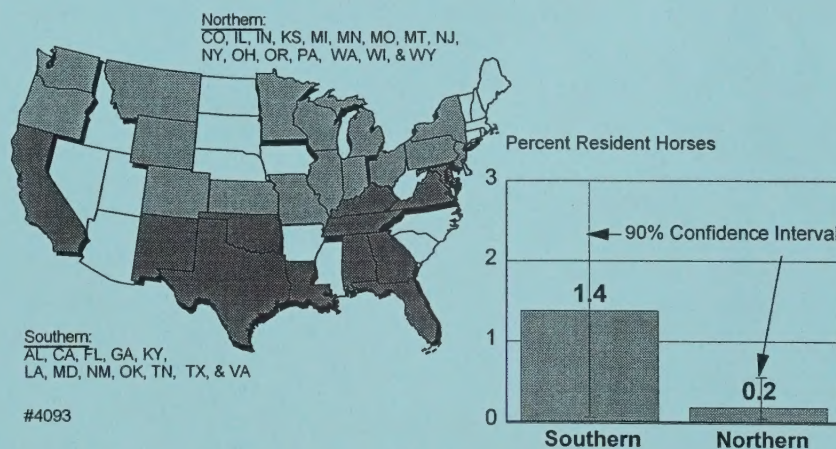


Figure 1 shows regional *estimates* and a measure of precision, the *confidence interval*. The graph shows that chances are 90 out of 100 that the true population value will fall between 0 and 3.0 for the Southern region and between 0 and 0.5 for the Northern region. These intervals would not overlap when significant differences exist (confidence intervals in this graph overlap between 0 and 0.5).

¹ Alabama, California, Colorado, Florida, Georgia, Illinois, Indiana, Kansas, Kentucky, Louisiana, Maryland, Michigan, Minnesota, Missouri, Montana, New Jersey, New Mexico, New York, Ohio, Oklahoma, Oregon, Pennsylvania, Tennessee, Texas, Virginia, Washington, Wisconsin, and Wyoming.

Northern region were positive for *Salmonella* although these results were not statistically different (Figure 1). At least one horse shed *Salmonella* on 3.1 percent of operations in the south compared to 0.8 percent of operations in the north.

Fecal samples were collected on half of the participating operations in each state during the summer of 1998. Samples were collected from the other half during the winter of 1998-1999. Thus, each state had horses sampled in the summer and winter. Shedding prevalence was higher in the summer with 1.1 percent of the horses found to be positive (Figure 2). Only 0.2 percent of horses were positive for shedding *Salmonella* spp. during the winter. Seasonal differences were not statistically different.

The percentage of operations with one or more horses fecal culture positive for *Salmonella* ranged from less than 0.1 percent of operations with fewer than six horses to 9.4 percent of operations with 20 or more horses (Figure 3).

Grain/Concentrate Culture Results

Horses may be infected with *Salmonella* through multiple sources, including contaminated feeds. One sample of the grain/concentrate fed to the majority of horses most of the time was collected from 895 of the Equine '98 operations.

Four samples from four different states were found to be positive. Grain samples were collected from a given operation in either the summer or winter, and all four positive samples were taken during the winter season. None of the fecal samples collected from horses on the four operations with positive grain samples were positive.

Additional information that may be related to prevalence of fecal shedding of *Salmonella* was recorded during the Equine '98 study, such as assessments of the overall cleanliness of the operations and the likelihood that rodents, domestic or wild birds, dogs or cats, or other wildlife may have contaminated the grain samples. During fecal sampling, the fecal consistency, age, gender, primary use, breed, antimicrobial treatment history, and body condition score of each sampled horse were recorded. NAHMS

Figure 2

Percent Resident Horses Fecal Culture Positive for *Salmonella* by Season

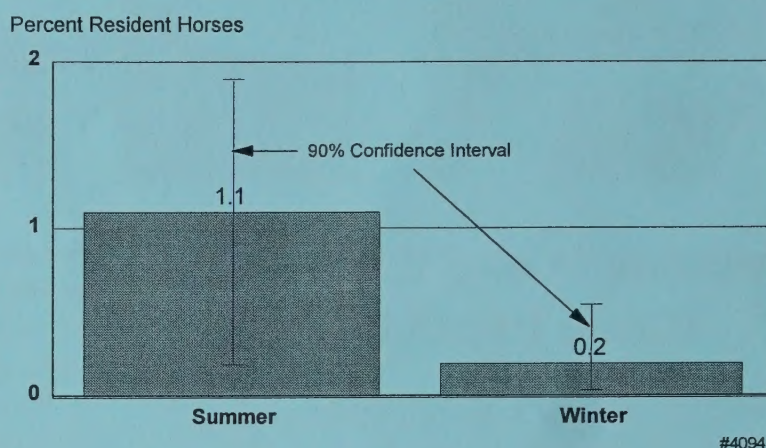
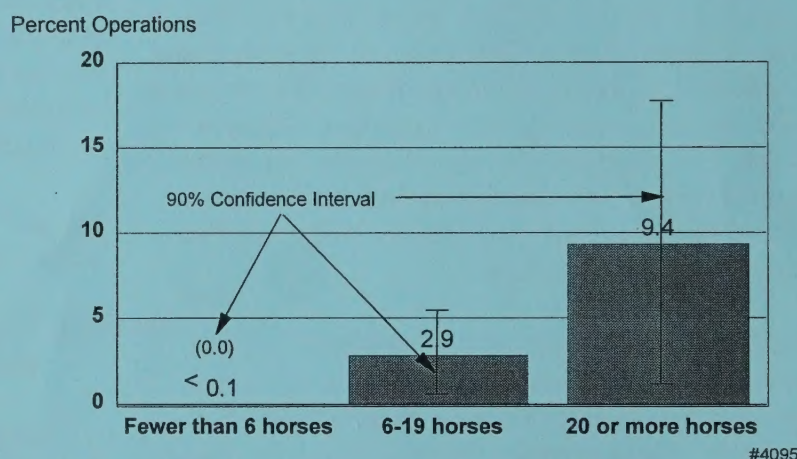


Figure 3

Percent Operations with at Least 1 Horse Fecal Culture Positive For *Salmonella* by Size of Operation (Number of Resident Horses)



has begun additional analyses of these data and the biologic sampling results to produce information on risk factors. Equine '98 *Salmonella*-positive samples were serotyped by the USDA's National Veterinary Services Laboratories (NVSL). Additional information on all analyses will be released when available.

For more information on NAHMS or the Equine '98 Study, contact:

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